

## **REMARKS**

### ***Formal Matters***

Claims 21-24, 45-49, 66-74, and 76-84 are pending in the instant application. Claims 21, 45 and 47 have been amended. Support for the amendment to Claims 21 and 45 can be found, for example, but not limited by, paragraphs 33, 38, and 42-45. Claim 47 has been amended to reflect antecedent basis from the claim from which it depends. No new matter has been added.

In view of the following remarks, the Applicants respectfully request reconsideration of Claims 21-24, 45-49, 66-74, and 76-84, the only claims under examination in the instant application.

### ***Claim Rejections- 35 U.S.C. § 102(b)***

In the Office Action dated May 29, 2007, the Examiner rejected Claims 21, 24, 45, 48, 49, 66-70, 73, 76-81, and 83 of the instant application under 35 U.S.C. § 102(a) and 35 U.S.C. § 102(e) for alleged anticipation by Ramstad et al. (US Pub. No. 2003/0228706 A1, filing date Apr. 14, 2003; hereafter Ramstad).

It is stated in the M.P.E.P § 2131 that in order to anticipate a claim, the reference must disclose each and every element of the claim:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

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The Applicants respectfully submit that the Claims 21, 24, 45, 48, 49, 66-70, 73, 76-81, and 83 of the instant application are not anticipated by Ramstad, either expressly or inherently, as each and every feature of the embodiments of the Claims 21, 24, 45, 48, 49, 66-70, 73, 76-81, and 83 of the instant application is not disclosed in Ramstad.

As presented in the Response of March 15, 2007, Ramstad does not teach a polyelectrolyte coating. Instead, Ramstad teaches *in situ* micro-encapsulation (see paragraph [0020]) with a size-exclusion resin. The micro-encapsulation taught in Ramstad takes a monomer and polymerizes or cross-links it around the ion-exchange core, which *in situ* synthesis results in a shell around the core (see paragraphs [0060] to [0062]). Embodiments of

the plurality of particles provided in the instant application features a polyelectrolyte which is polymerized before coating the ion-exchange core, not during preparation of the particle, as is disclosed in Ramstad. The ion-exchange particles of embodiments of the plurality of particles in the instant application are provided by exposing the ion-exchange core to a previously prepared polyelectrolyte polymer, which exposure coats the plurality of particles thereby. The teaching of Ramstad is fundamentally different since Ramstad teaches a size-exclusion resin that is *in situ* synthesized around an ion-exchange core to form a physical shell around the ion-exchange core whereas, according to embodiments of the plurality of particles in the instant application, a preformed polyelectrolyte polymer is exposed to an ion-exchange core to form a polyelectrolyte coating. To emphasize this point, Ramstad teaches that the monomers of a size-exclusion resin require an initiator or cross-linker in order to micro-encapsulate the ion-exchange core (see paragraph [0062]). Hence, as Ramstad does not teach embodiments of polyelectrolyte-coated particles of the instant application, such embodiments are not anticipated by Ramstad. Accordingly, reconsideration of claims 21 and 45 and their dependent claims is kindly requested.

In the Action, the Examiner rejected Claims 21, 22, 24, 45, 46, 48, 49, 66, 68, 69, 76, 78, and 79 of the instant application under 35 U.S.C. § 102(b) for alleged anticipation by Kristyanne et al. (US 6,504, 021 B2; filing date July 5, 2001; hereafter Kristyanne).

The Applicants respectfully submit that the Claims 21, 22, 24, 45, 46, 48, 49, 66, 68, 69, 76, 78, and 79 of the instant application are not anticipated by Kristyanne, either expressly or inherently, as each and every feature of the Claims 21, 22, 24, 45, 46, 48, 49, 66, 68, 69, 76, 78, and 79 of the instant application is not disclosed in Kristyanne.

In the Action it is stated that Kristyanne provides a plurality of particles, wherein each particle comprises a core for ion-exchange and a coating of polyelectrolyte, "...where a charged ferrous nanoparticle core is coated with a polymeric ion-exchange resin (i.e. polyelectrolyte)..."

The dimension of the ferrous nanoparticles, by definition, is on the order of  $10^{-9}$  meter, versus the ion-exchange resins taught in Kristyanne as primarily in the 25-300 micron ( $10^{-6}$  meter) size. The Applicants respectfully note that the three order of magnitude difference in the size of the inorganic nanoparticles in comparison to the significantly larger ion-exchange resin would result in the ion-exchange resin being coated by the inorganic nanoparticles; just opposite the statement of characterization made in the Action. In that regard, the teachings of Kristyanne concern the preparation of magnetized ion exchange resins by mixing the ion exchange

particles with the substantially smaller inorganic nanoparticles, and then separating the unbound inorganic nanoparticles in a washing process (see Col. 2; lines 19-23 and Col. 4; lines 11-17). Therefore, the statement in the Action that the ion-exchange resin coats the nanoparticle core is a mischaracterization of the teaching of Kristyanne. In fact, quite the opposite, Kristyanne teaches magnetizing the ion-exchange particles through the binding of the significantly smaller ferrous nanoparticles to the ion-exchange particles.

Therefore, the inorganic nanoparticle-coated ion-exchange resins taught by Kristyanne do not anticipate embodiments of the plurality of particles of the instant application that are provided by exposing an ion-exchange core a polyelectrolyte polymer. Accordingly, the Applicants respectfully request that the rejection of be withdrawn.

***Claim Rejections- 35 U.S.C. § 103(a)***

In the Action, the Examiner rejected Claims 21-24, 45-49, 66, 68, 69, 76, 78, and 79 under 35 U.S.C. § 103(a) as allegedly obvious over Parathasarathy et al. (US Pub. No. 2003/0138779, filing date Dec. 20, 2001; hereafter Parathasarathy) in view of Kristyanne, et al. (US 6,504, 021 B2; filing date July 5, 2001; hereafter Kristyanne).

In making the rejection, it is stated in the Action that Parathasarathy teaches all the elements of independent Claims 21 and 45, except for providing a mixture of the anionic and cationic ion-exchange particles. To find that element, the Examiner turns to Kristyanne.

It is stated in the M.P.E.P § 2143 that in order to establish a *prima facie* case of obviousness, the following criteria must be met:

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To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The Applicants respectfully submit that Parathasarathy and Kristyanne, either individually or in combination do not render embodiments of methods of Claims 21 and 45 obvious, as neither reference provides motivation or suggestion for embodiments of methods of

Claims 21 and 45. Moreover, Parathasarathy, as well as the combination of Parathasarathy and Kristyanne teach away from embodiments of methods of Claims 21 and 45.

It is stated in the Action that Parathasarathy teaches a method for purifying PCR reaction and DNA sequencing reaction products comprising providing a plurality of particles, wherein each particle comprises a core for ion-exchange and a coating of polyelectrolyte, and refers to paragraph 15 of Parathasarathy.

The Applicants respectfully submit that the teaching of Parathasarathy for the preparation of an ion-exchange resin is for an anion exchange material partially coated by a polymer; preferably a polyelectrolyte. This is not a minor nuance, but a significant teaching of Parathasarathy.

For example, in paragraphs 45- 47, Parathasarathy teaches partial coating by limiting the mass of polymeric material to surface area of anion exchange material (paragraph 45), and is also recited in terms of limiting the concentration of the polymeric material to the surface area of anion exchange material (paragraph 46). Parathasarathy teaches that in typical coating concentrations of polymer; or challenge concentrations, for the partial coating anion exchange material (e.g. 0.0001 wt% in deionized water), the recovery of DNA material is optimized, but if too much polymer is applied (e.g. 1.0 wt %), the dye-containing small organic molecules can be incompletely removed (paragraph 46). Additionally, higher challenge concentrations result in relatively long sample process times (e.g. about 10-15 minutes as per paragraph 47). Therefore, Parathasarathy teaches the advantages of partial coating of anion exchange materials through the effectiveness of removal of chemical species, as well as decreasing sample process times. In teaching the advantages of the partial coating of anion exchange materials, Parathasarathy teaches away from embodiments of methods of the instant application that teach providing various embodiments of polyelectrolyte-coated particles.

Moreover, in light of the disadvantages of more than a partial coating of anion exchange materials taught by Parathasarathy, embodiments of methods of the instant application that teach providing embodiments of polyelectrolyte-coated particles show unexpected results. For example, in the instant application, an embodiment of a method for purifying DNA sequencing reaction products is given in paragraphs 78-81 and Figs. 3a-3d, while an embodiment of a method for purifying PCR reaction products is given in paragraphs 83-85 and Figs. 4 and 5. In both examples, the purification is demonstrated to be effective, with sample process times of 5 minutes. Such results would be unexpected in light of the teachings of Parathasarathy.

Further, Kristyanne does not make up the deficiency of Parathasarathy. As previously discussed, Kristyanne teaches magnetizing the ion-exchange particles through the binding of the inorganic nanoparticles to the ion-exchange particles. The combination suggested in the Action of the partially coated particles of Parathasarathy and the mixture of the cation and anion exchange resin of Kristyanne does not overcome the deficiency of the partial coating taught by Parathasarathy. The partially coated particles suggested in the Action by the combination of Parathasarathy and Kristyanne teach away from embodiments of methods of the instant application that teach providing various embodiments of polyelectrolyte-coated particles.

Accordingly, no *prima facie* case of obviousness has been established, and the Applicants respectfully request that the rejection of independent Claims 21 and 45 and the claims dependent upon them be withdrawn.

In points 8 and 9 of the Action, various claims dependent on Claims 21 and 45 are rejected using tertiary references in combination with the above stated rejection of Claims 21 and 45 over Parathasarathy in view of Kristyanne. In point 8 of the Action, Claims 67, 70-72, 77, and 80-82 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over Parathasarathy in view of Kristyanne and in further view of Padhye et al. (US 5, 658, 548; filing date Jun. 7, 1995; hereafter Padhye). Additionally, In point 9 of the Action, Claims 73, 74, 83, and 84 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over Parathasarathy in view of Kristyanne and in further view of Breadmore et al. (WO 03/104774; filing date Jun. 7, 1995; hereafter Breadmore).

With respect to the criteria for suggestion or motivation found in cited art references, it is further stated in the MPEP (section 2143.01, paragraph VI), that the proposed modification cannot change the principle of operation of a reference:

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"If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)."

Both Padhye and Breadmore teach the use of silica-based adsorbents for the use of adsorbing the desired nucleic acid species onto the adsorbent, while leaving the undesired species from PCR reaction and DNA sequencing reaction products in solution. This is an entirely different mechanism of purification of a nucleic acid sample than that of Parathasarathy and Kristyanne, in which the undesired species are removed using the ion-exchange materials, and the desired nucleic acid species remain in solution. Therefore, the combination proposed in

the Action of Parathasarathy and Kristyanne with either Padhye or Breadmore would change the proposed principle of operation of Parathasarathy and Kristyanne.

As such, for either set of claims; Claims 67, 70-72, 77, and 80-82, or Claims 73, 74, 83, and 84, no *prima facie* case of obviousness has been established. Therefore, the Applicants respectfully request that the rejections be withdrawn.

Finally, Claims 23 and 47 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over Kristyanne. In the Action, it is stated that Kristyanne teaches the method of the independent Claims 21 and 45 of the instant application from which Claims 23 and 47 respectfully depend. The Applicants, in the above, have submitted that the inorganic nanoparticle-coated ion-exchange resins of Kristyanne do not teach or suggest embodiments of methods of the instant application that teach providing various embodiments of polyelectrolyte-coated particles. Accordingly, no *prima facie* case of obviousness has been established, and the Applicants respectfully request that the rejection be withdrawn.

### ***Double Patenting***

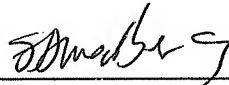
The Examiner's rejections under double patenting are provisional. Applicants reserve their rights to make arguments when these rejections have been formalized.

**CONCLUSION**

The Applicants submit that all of the claims are in condition for allowance, which action is requested. If the Examiner finds that a telephone conference would expedite the prosecution of this case, the Examiner is invited to contact me at the telephone number listed below.

Respectfully submitted,

Date: August 1, 2007

  
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